

**What is claimed is:**

1. A method for fabricating a semiconductor epitaxial wafer having doped carbon, comprising the steps of:

5 providing a quantity of carbon within a quantity of silicon;

growing an ingot from the silicon containing carbon;

forming a silicon wafer having carbon by slicing the ingot to obtain a plurality of rough wafers and then  
10 surface-treating the sliced rough wafers; and

growing an epitaxial silicon layer on a surface of each silicon wafer having carbon.

2. The method of claim 1, wherein a concentration of  
15 carbon contained in the silicon is between  $1 \times 10^{14}$  and  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

3. The method of claim 1, wherein the concentration of oxygen in the silicon wafer having carbon is between  
20 8 and 13 parts per million atoms (ppma).

4. The method of claim 1, wherein the epitaxial silicon layer of the wafer has a thickness of between 0.5 and 5 microns.

5. The method of claim 1, wherein the epitaxial silicon layer is used as a device active region.

6. The method of claim 1, wherein a further step  
5 comprises mixing the carbon with the quantity of silicon  
and then melting the carbon together with [(a chunk) of]  
the silicon.

7. A method for fabricating a semiconductor epitaxial  
10 wafer having doped carbon, comprising the steps of:

mixing a quantity of carbon with a quantity of silicon  
and then melting together the quantities of carbon and  
silicon;

growing an ingot having carbon from the melted  
15 silicon containing carbon;

grinding the ingot having carbon so as to produce a  
flat surface and a notch;

slicing the ingot having carbon into a piece of  
silicon wafer;

20 polishing the piece of silicon wafer having carbon; and  
growing an epitaxial silicon layer on a surface of  
the polished silicon wafer having carbon.

8. The method of claim 7, wherein a concentration of

carbon contained in the melted silicon is between  $1 \times 10^{14}$   
and  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

9. The method of claim 7, wherein the concentration  
5 of oxygen in the silicon wafer having carbon is between  
8 and 13 parts per million atoms (ppma).

10 10. The method of claim 7, wherein the epitaxial  
silicon layer is formed to a thickness of between 0.5  
and 5 microns.

11. The method of claim 7, wherein the epitaxial  
silicon layer is used as a device active region.

15 12. The method of claim 7, wherein the step of growing  
of the ingot having carbon is performed by a Czochralski  
method or a Floating Zone method.

20 13. The method of claim 7, wherein the polishing of  
the silicon wafer having carbon includes one process  
selected from the group of processes consisting of  
surface polishing, rough polishing, edge polishing,  
etching in an acid or alkali solution, thermal doner  
killing, and fine polishing.

14. A semiconductor epitaxial wafer, comprising:  
a quantity of carbon contained within a quantity of  
silicon;

an ingot formed from the silicon containing carbon;  
5 a silicon wafer having carbon obtained by slicing the  
ingot to obtain a plurality of rough wafers; and  
an epitaxial silicon layer formed on a surface of each  
silicon wafer having carbon.

10 15. The semiconductor epitaxial wafer of claim 14,  
wherein a concentration of carbon contained in the  
silicon is between  $1 \times 10^{14}$  and  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

16. The semiconductor epitaxial wafer of claim 14,  
15 wherein the concentration of oxygen in the silicon wafer  
is between 8 and 13 parts per million atoms (ppma).

17. The semiconductor epitaxial wafer of claim 14,  
wherein the epitaxial silicon layer of the wafer has a  
20 thickness of between 0.5 and 5 microns.

18. The semiconductor epitaxial wafer of claim 14,  
wherein the epitaxial silicon layer is used as a device  
active region.